

Abstract of the Disclosure

A typical integrated-circuit fabrication requires interconnecting millions of microscopic transistors and resistors with aluminum wires. Yet, aluminum wires have greater electrical resistance and are less reliable than copper wires. Unfortunately, current techniques for making copper wires are time-consuming and inefficient. Accordingly, the invention provides a method of making wires or interconnects from copper or other metals. One embodiment entails forming a first diffusion barrier inside a trench using ionized-magnetron sputtering for better conformal coating of the trench, and a second diffusion barrier outside the trench using jet-vapor deposition. The jet-vapor deposition has an acute angle of incidence which prevents deposition within the trench and thus eliminates conventional etching steps that would otherwise be required to leave the trench free of this material. After formation of the two diffusion barriers, the trench is filled with metal and annealed.

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